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DECEMBER, 1924

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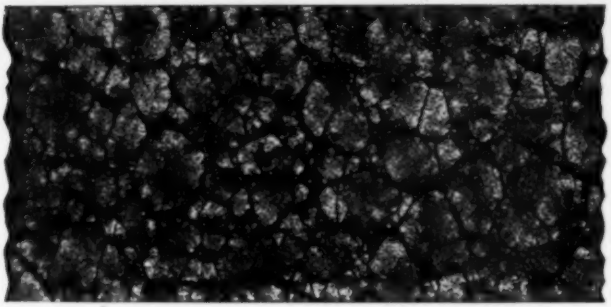

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With the Editor

THE other evening while reading I ran across an account of the unfortunate expedition of Doctor Salomon August Andree, who attempted to reach the north pole in a balloon. The late czar, foreseeing the possibility that Andree and his two companions might alight somewhere in Upper Siberia, sent a communication by various agencies to the wild inhabitants of his fartherest northern domains, explaining what a balloon was, who and what Andree and his men were. In other northern countries similar precautions were taken, with the result that news of Andree and his expedition was circulated far up beyond the circle. Can one imagine a people not familiar with balloons?

Considering the several million of the world's inhabitants who live in total ignorance of every day events and progress, we are particularly fortunate that we live in a section of the civilized world where we, unconsciously perhaps, but nevertheless do absorb and acquire an advanced education through mediums of newspapers, magazines, various forms of advertising, etc.

Newspapers serve us with news of current events, magazines amuse us, and from industrial papers, trade journals, etc., we learn of trade progress, practical methods of doing things as applied to our own particular vocations, as well as acquire information on that which is new and modern in equipment, materials and supplies.

Therefore it is not at all surprising that the first regular issue of INDUSTRIAL FINISHING should meet with an instant and spontaneous reception from foremen finishers, superintendents and owners of industrial plants where finishing coats are applied. Long without any exclusive representation of this all important productive unit in industry, the inception of this new publication can well be imagined.

And so, we present herein our second issue, better than the first, we hope. Read it carefully, advertisements as well as reading matter. With the thought always in mind that this is your journal, please feel free to call on the editor at any time, commenting, criticising or seeking information. The exchange of ideas never hurt anyone, but it has made the paths of all much easier to trod.

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Value of Technical Service to Customer's Finishing Department

Describing what a modern varnish manufacturer's service department really includes, and how it helps customers and their finishing foremen to solve various problems that are coming up from time to time.

By Service Supervisor

MANY of the larger and better known makers of finishing materials now realize that a sale is only half completed when a drum of varnish, a barrel of enamel or a quantity of lacquer has been delivered. The sale is not completed in reality until the customer has produced on his goods a finish that is entirely satisfactory to himself and to his customers. The successful manufacturer of finishing materials sells service and help as well as stains, fillers, varnishes or other coatings.

There was a time when the varnish manufacturer was satisfied to get an order and ship it, leaving the customer to get the best results he could, without giving any thought to the conditions under which the finishing material would be used. If the customer had printing trouble during hot, muggy weather, that was his own lookout. When he finally became so thoroughly dissatisfied as to change his source of supply he sometimes got out of trouble but often he found that regardless of where he purchased similar finish materials, troubles remained with him.

Times have changed! At least one large manufacturer of finishing materials for all types of objects, from pianos to automobiles and from toys to hairpins, considers this question of giving help and service to customers of great importance. This concern has established a Technical Service Division made up of a combination of practical men and technical men with experience in all lines of work from chemistry to the practical application of the finishing goods. It has been found that the technical man alone generally lacks the practical experience required to give advice on many problems of application, while the purely practical man often pays too little attention to details and does not get a thorough understanding of the causes for troubles and the reasons for taking certain steps to get out of trouble. The combination of technical men and practical men brings about a happy medium that is very effective.

It is the task of this Technical Service Division to assist the customer in solving all sorts of problems. If he is having printing trouble perhaps a practical man and a technical man will visit his finishing department. A thorough investigation is made of the temperature, humidity and other drying conditions. An examination of the various coats is made to see that each one is thoroughly dry before the next one is ap-

plied. The finishing coat is inspected to see that it is of the proper type to withstand printing. The method of packing the finished product is looked into. In fact, a thorough investigation is made of every phase entering into the finishing of the product from the time it goes into the finishing room in the white, until it is loaded for shipment.

After this investigation, recommendations are made for improving the finishing. Perhaps the finishing room needs to have certain changes made so as to bring into the right relation the temperature, humidity and number of changes of air per hour to get good drying results. If the customer prefers to install drying kilns he is given the names and addresses of several reliable manufacturers of the proper equipment; it is quite obvious that the Technical Service Division cannot be partial in recommending one make of equipment in preference to other makes.

If a customer feels he would like to condition his entire finishing department so as to obtain a good drying atmosphere, a rough drawing of the finishing room is made and details of location, size and number of windows, doors, elevator shafts, stairways, heating equipment and all other objects that might have an influence on the heating and ventilation of the room, are noted. This is then turned over to an engineer who figures the number of cubic feet of fresh air needed per hour, the amount of steam radiation required to secure proper temperature, and the most satisfactory size and location of these units. Then a blueprint is prepared showing all details as to size and location of air intakes, exhaust stacks or fans, heating coils and other equipment.

Perhaps, after an investigation, a certain printing trouble is found to be due to the finish coats being applied too soon after one another, so that the undercoats are soft and mushy. Perhaps the wrong type of stain, filler, varnish or other coating is being used. Maybe the goods are applied too heavily, or it may be that the entire trouble is due to the method of packing. Whatever the cause, it is located and recommendations are made for eliminating it.

Printing is mentioned here simply as an illustration to point out what steps are taken to eliminate the trouble. All other troubles, whether on furniture, automobiles, filing equipment or lead pencils, are handled in the same thorough and systematic manner.

Another important work performed by this Technical Division is in the nature of demonstrating new goods, or showing a customer how to get better results with old goods. In the case of furniture or automobile lacquers, which perhaps have not been previously used by the customer, a thoroughly practical service man is offered to assist in starting production and in instructing the workers as to the best method of application. The same holds true with other types of finishing materials.

Another service made available is consultation with the manufacturer who wishes to start a new line of goods, the finishing of which may not be entirely clear to him. Upon request a man is sent to give such information as may be desired and to assist in planning the type and location of the finishing equipment as well as in helping to lay out the logical sequence of operations, so as to avoid loss of time and floor space.

In the home office a technical file is maintained in which is collected and classified all sorts of information regarding equipment, causes of finishing troubles, how to eliminate these troubles, how to bring up various types of finishes on all kinds of objects and similar topics. Upon request any of this information is gladly sent out. For example, a customer may desire to install spraying equipment but does not know where to purchase it or what equipment will give him the best results. By writing to this Technical Service Division he obtains the names of several reliable manufacturers and perhaps is supplied with literature explaining the merits of the various kinds of equipment.

The Technical Service Division is very careful, however, not to recommend one make in preference to another and the customer is advised to make his own decision after having investigated the various spray equipment manufacturers. The same holds true with any other kind of equipment such as thermometers, dry kilns, sandpaper and all other equipment or materials used in the average finishing room.

All of this help is given free of charge and only with the idea of assisting the customer in getting the best possible finish consistent with existing conditions, together with the hope, of course, of obtaining new customers wherever possible.

Editor's Note: There are several manufacturers of finish who give service similar to that described above, and if any of our readers are having troubles or want information in their finishing department, we recommend they do not hesitate to freely ask their preferred source of supply for help, or write us and we will put them in touch with as many people as possible who can give them help.

The point we wish to make is this: Manufacturers of finishing materials today are anxious that their customers get good results. The customers, to be fair to the manufacturers should put their problems to them frankly and get the benefit of years of experience and contact with all kinds of problems. It is a well known fact that if one stays too close at home, one gets into a rut. All of us, however, cannot go around the country visiting other finishing departments but by having someone, such as a member of the Service Department of a paint or varnish house, visit us, we often get a great deal of help and a number of new ideas which may be applied to our own work.

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Cause and Prevention of Varnish Sweating

A practical foreman finisher explains several things which have puzzled many finishers and which account for the bad appearance of a finished surface, where the outer coat has been rubbed through.

By Wm. G. Pinner

FINISHERS frequently have trouble with what is sometimes called "sweating," but which is nothing more nor less than the varnish showing where one coat has been rubbed through to the coat below. Where three or more coats of varnish are put on a surface and rubbed it is often necessary to rub through the outer coat in places, in order to get the proper fineness of finish. With many finishers, it is a problem how to do this without having it show up. In the great majority of shops the major portion of the work is done in the right way without duly appreciating the importance of doing so. It is done more as a matter of convenience, and to save time between coats, than because it is the right way; and when, for some reason, the work is done in the wrong way, trouble arises and the finisher is at a loss to account for it.

When a varnished surface shows where one coat of varnish has been rubbed through to the coat below, it means that the two coats did not unite perfectly when drying. An imperfect union is the result of one coat being too hard at the time the next coat was applied. It sometimes happens this way: The finisher has a batch of goods going through the varnish room, and just at the time these goods are ready for the last coat of varnish, some goods which are in a rush are ready to receive the first coat.

The finisher is confronted with the problem of whether to put the varnish on the goods that are ready for the last coat, and for which there is no hurry, or to let them stand, and go ahead with the first coating on the goods which are in greater demand. As he does not understand the importance of a perfect union between the last two coats of varnish, and does not know that a perfect union cannot be made between two coats of varnish, one of which is quite hard, he will very likely let the last coating stand, and go ahead with the first coating, leaving the last coating for several days, or until the varnish already on is quite hard.

When the goods, that were held up to make way for the rush order, are ready to rub several weeks may have gone by. The incident of the holdup has passed out of the finisher's mind so that he is unable to connect the trouble which arises in the rubbing room with the cause. As a result he is very apt to blame the varnish, or blame everything but the right thing.

Sometimes the trouble is brought to his attention in this way: He may habitually leave too much time between the next

to the last and last coats of varnish; but the stock does not receive a great deal of rubbing, consequently no trouble results until an extra rough piece is found which requires extra rubbing, and the rubber goes through the last coat into the coat below.

Where three coats of varnish are applied, the correct proceedure is to allow the first coat to become perfectly hard before the second coat is put on, for the reason that a perfect union between the first and second coats is not important, as the rubber will seldom if ever go below the second coat into the first. It is important to have the first coat dry and hard as it reduces the time required for the subsequent coats to dry. When the first coat is quite hard there is no danger of crawling or creeping if the second coat is a little soft at the time of applying the third coat. The soft condition of the second coat will permit a perfect union between it and the next coat.

The trouble complained of may be caused also by the use of two grades of varnish, and rubbing through one grade into the other. Two different grades of varnish will produce different degrees of lustre when rubbed, and cause the rubbed surface to show an appearance of sweating.

If the last coat of varnish is not thoroughly hard at the time of rubbing through to the under coat, the trouble sometimes may be minimized by allowing the stock to stand in a good drying atmosphere after it has been rubbed for a period of 12 to 15 hours, then re-rubbing lightly. This will tend to equalize the lustre and cause the blemish to disappear wholly or in part, according to the condition of the varnish.

Stain for Silver Gray Finish On Beech.

The following is an excellent chemical stain for producing a beautiful silver gray finish on beech or quartered oak. It is permanent, will not fade, and can be varnished over. When mixing and using it, be careful not to get it on your hands or face. Mix as follows: add two parts nitrate of silver to 100-parts water, preferably distilled water or rain water that has not come in contact with metal. Coat the surface with this stain, and when dry apply a coat of acetate of iron solution, or you can apply more stain if the shade does not suit after the first application. It is recommended that you try a small quantity of this for color on a sample piece of wood before using it on the actual job you are about to undertake.—C. W. J.

Finishing Cedar Chests.

Finishers of red cedar chests frequently have trouble with the holes, where the wood has been chipped out around knots. There are several ways of filling these holes satisfactorily and without a great deal of trouble. The one best adapted depends on the way the stock is to be finished.

If the stock is to be finished in its natural color it is a good plan to first give it a coat of linseed oil, to which has been added a small quantity of brown japan as a drier. Then make a paste, or putty, of rose pink and Vandyke brown, using varnish as a binder. When the oil on the wood is hard, fill the holes with this paste, using a putty knife for the purpose and cleaning all smears off well about the holes. This paste dries rapidly and may be coated over on the following

day. If the smears of paste cannot be removed with a putty knife, they can be removed three or four hours after the holes have been filled, by means of a cotton rag dampened with benzine, naphtha or gasoline. This paste must not be put on the bare wood. The oil is necessary to make it stick for all time. There is no better way to bring out the color of red cedar than to give it a coat of linseed oil. The oil also serves to seal the minute air cells, and it holds up succeeding coats of finish.

This paste may be used before the wood is cleaned up for the finish, but it is necessary first to seal the pores of the wood in the holes to be filled. Use shellac for the purpose, applying it with a pencil brush. Shellac will prevent the wood absorbing the varnish from the paste, and will form a perfect and permanent union with the latter. Twenty-four hours after the paste has been put in the holes it will be dry enough to stand sandpapering.

A small cedar chest finished to bring out natural grain and color of this aromatic wood.

Another way to fill these holes is to use stick shellac. Sticks of shellac can be obtained from any wood-finishing supply house, in colors to match almost any wood as well as in transparent sticks. The shellac is burned into the holes, either with a knife heated over an alcohol lamp, or with an electric iron made on the principle of a soldering iron. Never melt the shellac with a match, because you will discolor it, and if it is the transparent kind its transparency will be completely destroyed.

The shade of red cedar can be changed slightly, as fancy may dictate, by using either white or orange shellac as a first coater, or by mxing the two. There was a time when anything was good enough for the outside of cedar chests, if indeed they received any finish at all. But now they are being nicely finished, and instead of finding their way into the attic of the home, they are considered a part of the household furnishings and are taking their place among the more costly articles of furniture. The inside of the chest is never finished, for to do so would destroy the natural aroma, which is one of the most desirable features of the chest.—Henry M. Raymond.

14,304,500 gallons of paints and varnishes were used in the automotive industries in 1923.

Lanken Vivian Company Increase Varnish Facilities

An interesting development—and somewhat of a surprise—occurred in the Cleveland paint and varnish industry Monday, with the announcement by the Lanken Vivian Co. that Paul F. Kinnison has been elected vice-president of the company and appointed director of sales.

Mr. Kinnison is severing his connection with the Sherwin-Williams company, where during the past eight years of a fourteen-year association he has been manager of the general varnish sales department.

The Lanken Vivian company has since its incorporation in 1914 been foremost among producers of marine paints and varnishes of the Great Lakes, and its present move is to further develop and diversify its operations by entering the industrial field with a full line of piano, furniture, automobile, insulating and implement varnishes.

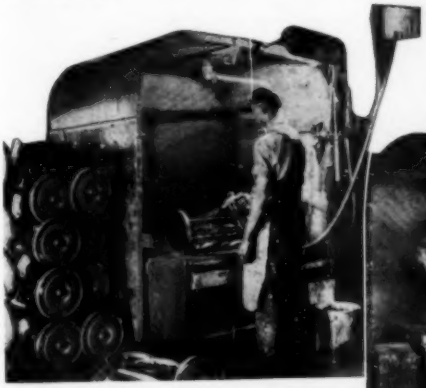
Modern Methods of Finishing Applied to Painting Lawn Mowers

How the bright colors are applied to the iron and steel parts of modern lawn mowers in a sequence of progressive operations which include spraying, dipping and brush painting.

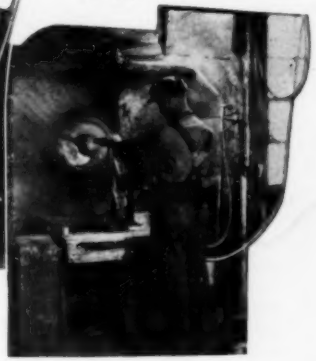
By F. W. Worthington

THE metal work on a new lawn mower, if you stop to think about it, presents a color scheme that is pleasing to the eye. Even the cheapest mowers have color. Lustrous gold bronze, aluminum, red, green and blue iron and steel parts with a wood handle and wood roller finished natural—these decorative colors help wonderfully in the sale of the article. Displayed inside or outside the local stores, during early spring, when the "call of the great outdoors" is in the air, they tempt the man who has a lawn to keep up.

Bright colors knock the drudge out of necessary labor. They have an attraction and a compelling appeal that cannot be ignored, even when used to dress up a tool or an implement of manual labor. Arrayed in its bright splendor the new lawnmower makes you want to take it home, and once you have it home you are on the job at the earliest opportunity, mowing the lawn. Is it work? Indeed no! You feel like a kid with a new toy. No lawn will suffer from need of mowing so long as the new mower retains its brilliance



Above: The mower is placed in horizontal position with the wheels clear of the table, so the operator can spin the wheels as he applies the spray.

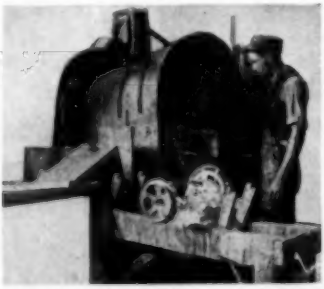


Below: When the mower is first put in the spray booth the operator stands it up first on one wheel, then on the other as he sprays with the air brush.

of color. Mowing the lawn is one of the home chores that is really a pleasure while the mower is bright and new.

The metal finishing process for lawn mowers possesses many features of interest. Formerly it was done entirely by hand brushing, but today only the striping and touching of raised letters and bolt heads are performed with the brush. Most of the work is done by spraying, some is done by the dipping process. Only the handle irons and some of the small iron fittings are dipped.

The main portion of the mower is given its coating of gold bronze or aluminum, or its solid color enamel with the air brush. Standard spray booths, spray guns and spray containers are employed, the same as in modern furniture finishing.



Spraying the wheels separately with spray gun to which is attached a small container for the paint.

In this particular line of metal finishing the sprayer system affords more real advantages over brushing than were ever claimed for it in any wood finishing process. It not only speeds up the rate of production, but, contrary to the experiences of many wood finishers it effects a substantial saving of finishing material especially in the case of gold bronzes and aluminums. It dispenses with the priming coat formerly used when hand-brushing was in vogue; it eliminates fatty edges, filled up inside corners, thinly-coated high places

The final operation of striping, touching up bolt heads and painting raised letters, is done by hand with the brush.

and brush marks; it permits the use of a thinner mixture and it gives a better luster to the finished surface. Ask the foreman finisher!

Gold bronze and aluminum paints are difficult to spread evenly with a brush. The brush always has a tendency to pull pigment off the high places and deposit it in the low places and inside corners. Bronze and aluminum pigment seems inclined to separate from the liquid and to pack in the bristles of the brush or bunch up ahead of the brush, somewhat like dampened dust collects in a mass in front of a broom. Repeated brush strokes over the same surface tend to deaden the luster of the rapid-drying paint and the brush marks are likely to show. The spray gun, however, drives home a thinner and more perfectly-mixed material, laying it on evenly and smoothly. There is no "drag over" action with a brush to thin the coating on high spots, to thicken it in low places, and to

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Kroeger's Fillers Cut Costs

THE HEAVY BODY
permits of more thinning than other makes and as a result will cover from 10% to 25% more surface, reducing the actual cost of the Filler.

NON-CAKING
either in the original package or after having been thinned for use, eliminates another loss. No need to throw any of our goods away. YOU CAN USE IT ALL!

IN RUBBING OFF
the surplus wipes off easily, leaves the surface smooth, obviates the necessity of sanding and thus effects a saving in labor.

FILLS PERFECTLY
making a good foundation for the final finish and effects a saving in the number of finishing coats used.

LET US MATCH THE FILLER YOU ARE NOW USING AND SUBMIT A COUNTER SAMPLE WITHOUT COST OR OBLIGATION.

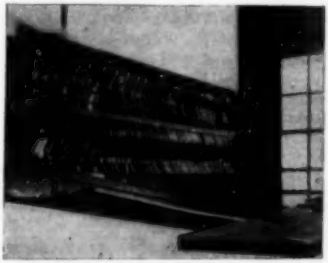
KROEGER BROS.,

Wood Filler Specialists Since 1887.

880 McKIM ST. BALTIMORE, MD.

deaden the natural luster of the finish.

The factory where the accompanying pictures were taken has an annual production of 80,000 lawn mowers made up in various styles, sizes and colors. Three spray booths are in operation—two for spraying the main portion of the mower and one for spraying the wheels separately.



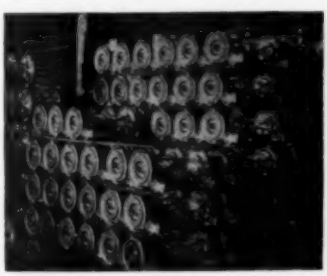
Lawn mower handle irons are dipped and hung on a rack above drain board.

At each of the two larger sprayers, where the main portions of assembled mowers are first sprayed, the paint is carried in the regular type of 5-gal. container suspended overhead by a safety block and tackle. The container is fitted with a cover and an air agitator, the agitator operating in the bottom of the bucket. Just enough air is released through the agitator to produce a gentle bubbling of the liquid at the top.

Gold bronze and aluminum paints consist of a very fine powder mixed with a liquid made especially for the purpose. The powders and the liquid are purchased separately, and the operator mixes up small batches at a time so he will use up all that is mixed when he finishes a certain job and when he completes his day's work. Directions for mixing are supplied with the material.

The finisher learns through experience what proportion of materials to use to produce the desired consistency, and he learns the peculiar characteristics of each brand of material. For example, in this particular factory powders and liquids are both purchased from two concerns. It has been found that for the highest grade work, the gold bronze powder of one make mixed with liquid supplied by the other concern, produces the best results. Before changing from one color to another and before quitting at night the operator cleans his spray gun, fluid hose and the container thoroughly with gasoline.

Placing a mower unit on the table in the booth, the spray-operator rests it first on one wheel and then on the other, while he sprays the reel, cross rods, gear guards and the insides of the wheels and frame. Then, grasping it by the tree rod, he places it in natural horizontal position with the tree rod resting in the fork of a short upright, to hold the wheels clear of the table. In this position he finishes his part



Mowers stacked up to dry after they have been striped, and the raised letters and bolt heads touched up with a bright contrasty color.

of the work, spinning first one wheel and then the other to give them either a partial or complete coverage—depending on whether or not they are to be painted another color later. If the tree rod is to be painted another color (as it usually is) the operator uses this part as a handle when removing the painted mower from his booth. Otherwise, he uses a pair of "young hay hooks" to lift it and place it in position to dry.

After the first spraying, mowers are usually allowed to air dry until the next day. The second operation is to finish the wheels. If they require a different all-over color they are sprayed at the smaller booth with a cup gun. In preparation for this operation the mower is lifted onto a bench beside the wheel booth and each wheel is removed, sprayed and replaced. Inside the booth and above the regular turn-table, the wheel is supported in nearly level position by a small stand shaped somewhat like the legs of a swivel chair. Sprayed wheels are replaced on the mower and the entire unit is passed along to a work bench where a man with a hand brush paints the tree rod or adds some touches to other parts of the mower, and then stacks it away to dry. When the wheels are not sprayed all over in another color on this last sprayer, parts of the outside wheel faces and sometimes the corrugated tires are painted with a brush. This constitutes the second operation.

The third operation consists of final striping and touching of raised letters, bolt heads, etc. This is all hand brush work, and it is performed on work benches in front of windows. Following the striping comes stacking again for air drying. Then the wood rollers are put on, the mowers are inspected, oil holes cleaned, oil applied and the machines are given a running test in front of a long carpet-covered drum, which is rotated by power.

Removing Finish to Prepare Surface for Lacquer.

It has been my experience that lacquers will not work successfully on a surface that has been cleaned with varnish remover. Certain chemicals in lacquers are so strong that they will draw out the traces of varnish remover which remain in places where it could not be, or was not, completely washed off the surface. Sometimes trouble occurs after two or three coats of lacquer have been applied.

After considerable experimenting along this line, I find it is cheaper and quicker, where lacquer is to be used, to clean the surface with plain lacquer thinner. My way of doing this is to mount the work on the spray-booth table and, with the spray, soak the surface until the old finish begins to wrinkle. Then use the blower or duster to blow off the loosened coating. Soak again if necessary, but nearly always the first time will take it all, excepting some that remains in crevices and inside corners. To remove this take a knife or sharp tool of some kind, and scrape it clean. Wipe off with a rag. Very seldom is it necessary to sandpaper the surface before the first coat, as this thinner doesn't raise the grain.—J. K. Cooper.

All surfaces, metals especially, should be clean, smooth and dry before any preliminary finish or paint coats are applied.

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Standardizing for Finishing Room Efficiency

A capable and experienced production engineer explains why some finishing-room work is unsatisfactory in quality, too slow in process and excessively high in cost, and he submits valuable suggestions for remedying conditions that are responsible for such results.

By Rudolph Willard

THE art of scientific management was first developed in the metal-working trades and its development there has been chiefly responsible for the wonderful showing in manufacturing efficiency in such industries as the automobile industry. Mr. Robert Julius Anderson, writing in Industrial Management, states that one dollar today will buy $1.11 worth of automobile at 1911 prices while for furniture it will only buy 53 cents worth. Of course many factors may be partly responsible for this, but nobody can deny that the application of scientific methods is one of the biggest reasons why automobile manufacturing costs have decreased in spite of a higher level of general prices.

Finishing processes are so widely different from metal-working machine processes that, at first thought, it seems impossible to draw any parallel. But is it impossible?

Take the question of standard times. In order to set an accurate standard time for lathe work, the process and material must be standardized so that the operator always has the same work to do under the same conditions. How many foreman finishers always get the work from the cabinet room in uniform condition? How often does the veneer surface to be finished show sand scratches, torn grain and sap streaks? How often do the turned parts come sanded, some smooth, some rough and some awful? And how many managers jump on the finisher for a rough job of finishing when he had no smooth surface to start with?

It is unquestionably true that the smoother the job is sanded before finishing, the less it will cost in the finishing room to turn out a smoothly-finished job. Of course, there is no use sanding a cheap dresser as much as a piano case but let there be a standard of quality worked out for sanding the goods in the white, and then stick to that standard for every piece. Don't expect low-cost finishing on work that varies all the way from smooth surfaces to "fence rails."

Another point is the class of help. How often have you seen a filler room where the foreman is limited in wage rates and can get only the lowest class of common labor? Don't expect a smooth finish if the filling is sloppy. Filler is supposed to bring the job up to a uniform surface by filling the pores of the wood. To fill properly it is necessary to have the right amount of binder in the filler for the atmospheric conditions; it is necessary to let the filler dry just long enough,

and then rub it off across the grain. After this the work must be thoroughly cleaned of all excess filler to avoid muddy color.

While the work of filling is not complicated and does not require great manual skill, it does require intelligence and an experience which tells the man when to work, how to work, and when to quit working. He must know when he is through and when the job is done right. Don't let your filler room run itself any old way. As the Chinese laundryman said "No checkee, no washee," so no good filling, no finish.

The materials also should be standardized. In mixing stains they should be weighed out to a formula, not guessed at. If the shellac and varnish need to be cut there should be a standard for that. Deviations from standard cut are desirable under abnormal conditions of temperature and humidity, but it is a good plan for the foreman or some other one man to do any special cutting required. Too many workmen want to pour in a dash of this, that, or the other, without much thought or knowledge of what is really needed.

Don't keep switching brands of finishing materials. No two varnishes work exactly alike. Learn how to get satisfactory results with one kind and then stick to it.

Conditions in the finishing room also need attention. There is a range of temperature in which finishes work best. Humidity also affects some finishes, especially lacquers. Don't try to get results from varnish applied in a cold room or to cold goods. Have an adequate heating system and keep a uniform temperature.

Closely allied to humidity trouble is water and oil in the air line where sprays are used. Careful piping of the air with oil strainers and water traps, which are cleaned out regularly, are essential.

Another bugbear is dirt. It is almost unbelievable how much longer it takes to rub a varnished surface which is full of dirt, that settled while the varnish was drying, than it does to rub a clean coat. Paraffin oil is cheap and if the floor is kept oiled once a week or so, it will work wonders in keeping down dirt. It is also a help to have the sanding of shellac (and varnish if that is sanded) separated from the varnishing space by a tight partition. Another trouble-maker is the cyclone or dust-collector on the boiler room roof. How often you will see a cloud of dust blowing from the collector up to the finishing room windows.

To summarize, here are some of the points that need study and standardization at the conditions found in the study to be most efficient:

1—Condition of the surface of the work to be finished.

2—Class of labor.

3—Formulae for stains, etc.

4—Kind of finishing materials and percent. of cut.

5—Temperature of finishing room.

6—Dirt.

7—Clean, dry air from the compressors.

8—Drying time for different coats.

If these standards are held at the most efficient point, it will be easily possible to set fair rates on either piece work, premium or bonus payment plans. Nothing will have a greater effect in pull-

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ing down labor costs per piece than to give the men an incentive to save time. Don't worry if your men do make more per week than they did on day work. It is not the amount a man draws per week, but the unit labor cost per piece produced that counts in the profit column.

The question of floor space would take a book by itself for complete discussion, but the fundamentals are simple. With a certain finishing process and certain materials there is a definite minimum time required for coats to dry properly for the next operation. There are several ways of reducing the drying time without injury to the finish. One is the use of an air washing and ventilating system with temperature and humidity control to dry the varnish coats.

How often is a finisher forced to rush his process in order to get production out of a certain floor space, with the final result of a finish that won't stand up? Often nothing but a service test will prove whether a finishing schedule is too fast; but a manager should be slow to condemn a finisher for the finish going bad in the trade, if he has been forced to rush his process to get production in limited space.

There is a lesson here for those building new plants. How many shops do you know where the finishing room is not the limiting factor to production for the shop? You can work your machine or cabinet room double shift in a pinch, but the coats of finish must dry so that double shifting does not go in the finishing room. Why not plan on extra space for finishing so that the process will not have to be rushed to the detriment of the finish. Of course, if your shop is all built you may have to resort to all sorts of devices to speed up finishing, but in planning a new shop why not make adequate space allowance and insure a satisfactory finish?

The essence of scientific management is study and standardization. This study touches the work received, the materials, the time, the conditions of the work room, the layout of the work room, and last but not least, the worker. Too long the woodworking industry has run "by guess and by gosh." But with keener competition ahead, profits will go to the shop that uses scientific methods.

Painting Smoke Stacks.

Where metal smokestacks are used the cost of keeping these protected from the weather is considerable, unless they are painted with the right kind of material at the start, and kept well covered. If a smokestack is once allowed to become rusty, that part can never again be properly protected unless the rust is all scraped off, because the rust will continue eating into the metal and cause the protecting material to scale off.

Nothing about the factory is exposed to more severe conditions than is the smokestack. On the outside there are the extremes of heat and cold, while on the inside there are varying degrees of heat, all of which keep the metal in a perpetual state of either expansion or contraction. Unless the paint, with which the metal is covered, is of an elastic nature it is sure to crack and peel. Many years' experience has demonstrated that there is probably nothing better for outside work on metal than a pure as-

phaltum and linseed oil varnish. There are many grades of asphaltum varnish on the market. Some of them contain rosin, coal tar, etc., in varying proportions. These will not stand up under the severe conditions to which a smokestack is exposed. The first cost of the best grade of asphaltum varnish is much greater than that of the inferior grades, but it is cheaper in the end.

The big item in the cost of painting a smokestack is the work. A good coat of the best

Steel smokestacks and the steel framing of tower tanks should be painted at the time of erection and regularly thereafter to prevent rapid deterioration through rusting.

grade of asphaltum will last as long as three coats of some of the inferior grades, applied at such intervals as are required to keep the metal coated and protected. From this it is easy to figure how the best asphaltum is cheapest in the end. Rosin, which is the adulterant in many cheap asphaltums, will withstand neither heat nor wet weather. On the other hand pure asphaltum and linseed oil will bake hard like an elastic enamel, and give an enduring finish.—L. S. Depeau.

A Finisher's Varnish Experience.

When a new brand of varnish is mentioned to a finisher, or some one who is acquainted with the practical requirements of a varnish, the first thought that comes to his mind is whether it is a good or poor-grade article —whether it will stand up a given length of time under different conditions, such as dampness, heat, intense cold or poor ventilation.

As I see it, the only thing we finishers can do is to take the salesman's word for what a new brand of varnish is and what it will do. We can put it through the finishing room for a trial, possibly with another or a number of other samples, giving each brand of varnish the same test as to rubbing or polishing qualities, toughness, durability, drying qualities, etc. However, after all of this, what have we learned aside from perhaps getting a little more shop experience?

Who knows how a piece of furniture is going to be treated after it leaves the store or factory; or what hardships it may be subjected to? I have seen returned to our factory for repairs, new furniture that had been given practically the same finish (as nearly as possible the same) as goods that we had shipped three or four years previous and which was still in excellent condition. In some cases we find the finish on the older goods in the best condition.

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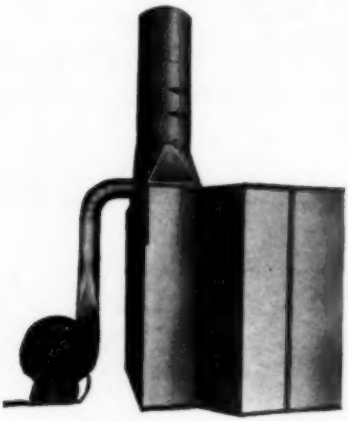

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A great deal depends on how the piece of furniture is treated after it has been finished and received in homes. Many times a good finish is damaged or ruined through the use of highly-advertised furniture polishes, which so often contain strong alkali or acid. For people who have no practical knowledge of finishes, a safer plan is to wipe the surface first with a bit of oily cheese cloth, then follow up by wiping the surface dry with a piece of dry cheese-cloth.

Now, I am not boosting or knocking any particular brand, but my idea of a good varnish is one that is made from a good grade of Kauri gum containing enough oil only for elasticity, and thinned with pure turpentine and Japan dryer. This of course is not intended for a formula, but it is just my opinion. Any reliable manufacturer will supply you generally for what you are willing to pay. Any finisher knows that a good outside varnish is not intended for inside use, nor is a good furniture varnish intended for outside work. The difference in kinds and percentages of oil and grades of gums used in varnish manufacture makes each varnish practical only for use as intended.—Roy L. Knoll.

Spraying Lacquer.

In the use of lacquer, either on wood or metal surfaces, proper spraying is very important; the final result depends largely upon how skillful this operation is performed. Be sure to thoroughly reduce and agitate the lacquer. Always use a hydrometer in reducing—do not guess about the right consistency—and always use the thinner furnished for the lacquer. Never mix different brands of lacquer, as they are made under different formulae.

Remember that lacquer is a moisture absorber, so keep the container well covered. See that the spray apparatus is equipped with a moisture and oil separator, as water and oil do not harmonize with lacquer. Never spray a job near an open door or open window. Never spray on a coat of lacquer until the other coat is dry. Do not spray lacquer on any coat that has been water sanded until the surface is completely dry again; if a surface has been oil sanded, be sure to clean off all oil. Spray all edges first before spraying across panels, to be assured of enough stock on the edges and so avoid the possibility of cutting the edges in the final rubbing and polishing.

Cheap Varnish Replaced Shellac as First Coater.

The foreman finisher in a refrigerator plant using the sprayer, says that they formerly used shellac as the first coat, but found that a cheap grade of varnish, or a surfacer, gave not only more economical, but even better working results. They now apply three coats of varnish, including the surfacer. The foreman explained that shellac dried too rapidly. He says that the air-spray forces the varnish surfacer into the wood; it penetrates better because it is not such a rapid-fire drier. These refrigerators are made mostly of birch, and three coats of varnish give very handsome finish.—Traveler.

Period Finishes—Gothic

Producing, with modern finishes and colors, the subdued high-lighting, dull effects, antique appearance and open-pore surface required on finished carvings and ornamentation of the rugged Gothic style.

By R. G. Meade

GOTHIC furniture was an outgrowth of the distinctive architectural treatment applied to ecclesiastical buildings in the 11th and 12th centuries. Crude and heavy in construction, particularly in its earlier development, it always remained massive and its religious associations are so strong that even today most reproductions are to be seen in church and lodge work.

A typical piece of modern Gothic.

Very few original examples survive except as installations in cathedrals and abbeys but from pictures and manuscripts we know that the medieval castle was sparsely furnished. Sand, straw or rushes covered the floor; the walls were hung with tapestries; windows were narrow open slits in thick walls. Furniture consisted of massive canopied four-post beds, benches, folding stools, great carved chests, and a long trestle table for the dining room.

It is in its unusual carving that Gothic is most easily recognized. The body is square in design with panel spaces divided into rectangular shapes and filled in systematically with geometric patterns, shields, badges, crests, circles, oak leaves, trefoils and quarterfoils. In the 14th and 15th centuries painting partially supplanted carving and the panels were filled with polychrome heraldic devices, tournament, Biblical and hunting scenes.

Oak was the wood chiefly employed although the medieval craftsmen also used chestnut, cypress, deal, beech and elm. It is improbable that any finish was used on the originals—at best it was very likely a vegetable oil since nothing was then known of varnish or even shellac. As a consequence we have very little to go by in the way of precedent for finish color.

Modern reproductions, apart from the types above mentioned, are apt to be phonograph cabinets, hall chests, joint stools and benches, and by common consent the wood is stained a reddish, grayish or nut brown, on the order of the familiar Mission, Weathered and Jacobean oak finishes. Ready-mixed, penetrat-

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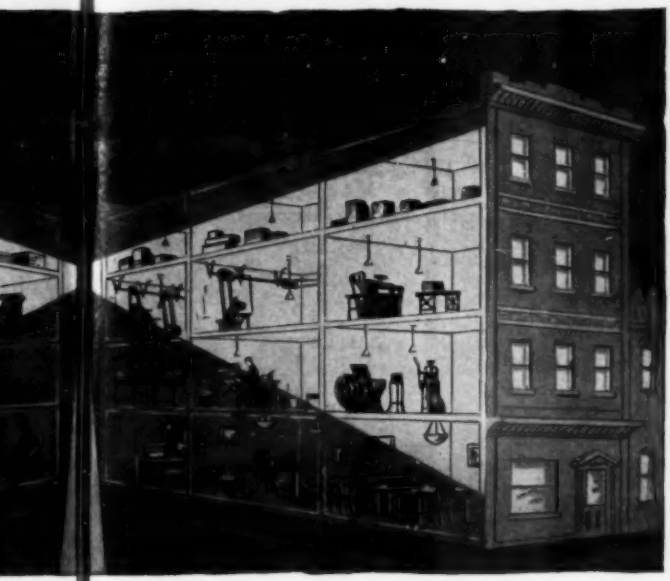

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ing oil stains are obtainable under these names which serve the purpose very adequately. Pigment stains are permissible where cheaper woods are used; for a close imitation of the genuine antique, use an ounce or two of nigrosene powder dissolved in hot water.

For the protective finish apply a coat of shellac or lacquer and flat varnish or wax, and rub dull. For an additional antique effect mix a liberal proportion of powdered rottenstone in the wax, or dust it into crevices while the clear wax is still wet, wiping away from raised parts with a cheese-cloth. The less lustre left, the closer will be the approach to the authentic so that polished and even dull-rubbed lacquer and varnish are absolutely barred. Gothic is an open-pored finish so that filler is also inappropriate.

Any high lighting must be very much subdued but it is essential where panel sections of any size are not filled by carving or color. Painting is best confined to smaller panels and restricted to the simpler heraldic forms—as for example, a shield with one or two bars—using dull reds, golds, blues or greens, but not the strong tones peculiar to polychrome. Where the carving takes a form resembling church windows it is permissible to pick out the ground work in rose, medium blue and yellow, as one sees in stained glass.

The best mixtures for coloring are half oil and japan—easy to work but without excessive gloss, and drying to smut in five or six hours. This "smutting" or "antiquing" operation is a very important one since the colors may drying, which is out of harmony with the whole gothic idea of age. The "wipe" as it is often called, is usually made of equal parts of Van Dyke brown and burnt sienna in oil reduced to thin consistency with turpentine. Occasionally a small amount of lampblack is also added.

This is brushed on the color, then wiped off while wet with clean muslin so that the deposits are heaviest in grooves and along edges; only a thin film is left on raised flat or rounded parts. If the color is still too vivid the wax and rottenstone mixture above described is applied; if not apply flat varnish, and the job is done. High-lighting on unpainted surfaces may be accomplished by wiping where oil stain is used; with water stain, wait till the stain is dry and sandpaper with No. 00000. Unless the finisher has had previous experience in color decorating or shading it will be best to do some experimental work beforehand. Both operations call for a fine touch and something better than the average sense of color harmony.

Western Zone Convention

The Pacific Northwest has been selected for the Western Zone Convention of the National Paint, Oil & Varnish Association, the time being set for July 16, 17 and 18. The Paint Club is planning, at the present time, some unique and original methods of conducting a convention.

New Lacquer System for Refinishing Automobiles

The Lykglas Auto Renual System, Inc., Indianapolis, Ind., announces to the automobile paint trade a Lykglas lacquer which is claimed to be a new non-perishable finish that will give a high luster without being rubbed or polished. It dries rapidly and is made in ten standard colors and black and white. These colors are intermixable.

Industrial Finishing

PRACTICAL PUBLICATIONS, Inc.
Publishers.
210 Holliday Building
Indianapolis, Ind.

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

DECEMBER, 1924

Favorable Outlook for Future

For some months previous to the fall elections here and in England, a lot of uneasiness appeared in business and industrial circles about the possible outcome. A scare was thrown into the general public by vivid word pictures and printed prophesies of what would happen to business if—well, if the election went wrong. Constant repetition always has its effect. As election time drew nearer and nearer, more and more people succumbed to the feeling of uneasiness; the thing became a menace to business.

Looking back now from our present vantage point of sound security, we realize—or believe so at any rate—that before election there was little if any room for doubt of the outcome. But before election it was different. We thought we saw the shadow of a frightful menace; people talked about it, we heard our politicians and we read our newspapers. Finally the big day came—a beautiful day and a great turn-out of voting power. Followed quickly early returns indicating the trend—and then the final result.

Well, the dust has settled now and all the smoke screen has faded into thin air. The parties and individuals favoring a sound, economical and conservative business administration, with a friendly and encouraging attitude toward business, industry and commerce, are swept into power. Practically the same result occurred at the British elections in the conservative victory. Indeed we have much to be thankful for.

The only reasons why all business hasn't stepped out faster immediately after election, are: It takes a little time to get over a scare; takes time to regain one's equilibrium and normal poise. Then, too, the end of the year is almost at hand; inventories must be taken and annual statements on volume of business must be prepared. (These statements on volume of business are going to run into big figures in spite of this being election year.) Plans for next year must be hurried to completion; this is no small task, remember. Then everything will be ready for a good start and an early start for a prosperous 1925. So, when the holidays are over, let's go!

Good Year in Prospect for Furniture Manufacturers

Indications point toward an exceptionally prosperous year for furniture manufacturers and allied lines—a 1925 of greater volume in production and sales than 1924. Fall business in the furniture industry has been very encouraging. In Grand Rapids, for example, shipments of furniture during October broke previous records, with a total of 425 cars. The previous record for a single month was 406 cars in March, 1923.

Reports from the South and other furniture centers show unusually heavy shipments of furniture. Furniture manufacturers all over the country are optimistic regarding the future; reports from large numbers of them indicate that they anticipate doing from 10 to 50 per cent. more business in 1925 than in 1924.

Public Demands Color

Everywhere we see evidence of the fact that today people favor color—not gaudy colors; not colors in combinations which lack harmony; not colors that will fade; but real, rich color; color of depth, luster and permanence, and color that is in harmony, and appropriate. Color appears profusely in modern advertising of all kinds; and there is a beauty and harmony to it that compels attention and excites admiration. Color has been extended into business of all kinds, into engineering, into amusements, and into the home. The interior decorator, the painter, the finisher and workmen in various manufacturing industries are employing it more and more. Demands for color are on the increase, and wherever or whenever a demand appears it must be satisfied.

The future of color in industry depends upon how well this demand is going to be satisfied. The thing must not be overdone or done cheaply in a hurried eagerness to make money for the time being only. This would cause a healthy, progressive taste to degenerate into a passing fad. There must be study, experimenting, standardization, and a religious regard for quality, permanence and harmony on the part of all who have any responsibility in the matter. This includes all concerns and individuals who manufacture, sell, use, specify or apply colors and finishes—paints, enamels, lacquers, stains, shellacs, fillers, varnishes. It is a task of co-operation and honesty in business. It calls for skill and sincere striving for perfection all the way down the line.

Chemists, paint and varnish manufacturers, salesmen and service men have a huge responsibility in the matter of supplying and recommending colors and finishes. Manufacturers whose products are painted, enameled or finished in color or in imitation or natural finishes; their management, their designers, their purchasing agents and their finishers have a responsibility to fulfill. Use good colors and finishes; use good equipment and use it intelligently; select color arrangement and color schemes wisely. Otherwise a good thing will be ruined.

The Business Trend

At no time in recent years have conditions been more emphatically favorable for a period of sustained prosperity. This does not mean that a boom is imminent. Fortunately that does not appear to be the case, despite the abundance of money. Inflationary tendencies may be dampened by higher loan rates as loans expand.

Europe's gain is measured by strong exchanges. Sterling is still advancing. Of great significance, the new German mark has appeared on the exchange market and it is quoted at a slight premium over the dollar.

Transactions on the stock exchange since the election have

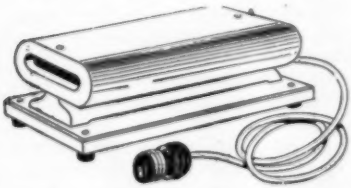
swollen to the largest volume since 1919. The totals have been equaled only a few times in the past. The average of fifty industrial and rail shares at the close of last week had scored a new high for the year.

Industrial shares gained, but chief interest was centered upon the rails. This is because of their huge record-breaking traffic, their increasing earnings and the fact that government ownership has been buried by an avalanche of votes.

In the commodity markets firmness is spreading. Wheat has rebounded nearly to the year's high mark. Fuel oil and metals are stronger. Iron and steel are less weak. R. G. Dun's index number for Nov. 1 was the highest since January, 1922.

Electric Heater For Finish-Patcher's Knife.

Wherever finishes are applied to furniture or any other kind of woodwork, occasions frequently arise for the use of a hot knife or iron to burn in stick shellac or some similar substance, which is employed to build up dents, or



fill cracks and marred or defective places on the finished surface. It is both unsatisfactory and dangerous to heat the burning-in tool in a flame of any kind.

Recognizing this fact, the Bobbett Electric Mfg. Co., 815 E. 43rd St., Chicago, Ill., has brought out a new electric heater especially designed for heating finish-patcher's knives. It is the patent of J. H. Jacobson, and is called the "Heat-A-Knife." As will be noted by the accompanying illustration, it is a light portable device with drop cord and plug for connection to any electric light socket. Knife blades may be inserted in either end of the aluminum cylinder, the opening of which measures $\frac{1}{16}$x1$\frac{1}{16}$x 5¼-in.

Cement Paint Contains Boric Acid to Retard Setting

Spencer B. Newberry, of Cleveland, Ohio, adds boric acid or a borate and a hygroscopic salt to cement for the purpose of retarding setting, so that the mixture may be used as paint. Cement with the addition of 0.1 to 1 per cent boric acid and 1 to 10 per cent. calcium chloride may be kept in closed containers in dry form and mixed with 40 to 60 per cent. water to form a cream that may be applied by brush or spray. (Patent 1,510,795, assigned to Medusa Cement Co., Cleveland, Oct. 7, 1924.)

Continental Products Co. Takes Over Part of Pure Oil Co.

Milton W. Einstein, president of the Continental Products Co., of Cleveland, announces that his company has purchased the plant and business of the Cincinnati Branch of the Pure Oil Co., of Columbus, Ohio.

This plant is located at Elsinore and Gilbert ave., and will be used by the Continental Products Co., for the manufacture of paint and boiler-water treatment specialties. The Cincinnati branch will also job the Continental Products Co.'s varnishes.

George A. Ditty, formerly connected with the Pure Oil Co., is now associated with the Continental Products Co., and will have general supervision of the Cincinnati sales and office force.

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Cellulose Rough Stuff
Cellulose Sanding Surfacer
Cellulose Body Glaze
Cellulose Ground Color

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Manufactured by

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☐ Send sample panel.

☐ Send trial barrel. It is understood that if after using five or ten gallons I am not satisfied I may return the balance at your expense. Velvite Rubbing in barrels, $1.75 gallon. In five-gallon buckets, $1.85 gallon.

NAME.....

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Cost Accounting in the Finishing Department

A thorough analysis of finishing costs, with complete information regarding all conditions entering these costs, reveals some surprising facts and accounts for wide fluctuations in the cost of production in many apparently well-managed factories.

By A. K. Rosswell

COST accounting in the finishing department differs somewhat from that in other departments of the factory, for the reason that in the former there are at times many items of expense over which the finishing department has no control and which ought properly to be charged to some other department.

To be of any real value, apart from enabling one to know the total cost of production as a guide in setting the selling price of an article, cost accounting must show cost of material, cost of productive labor, cost of non-productive labor, and cost of repairs. In view of several improvements that have been made in recent years in the methods of performing certain operations in the finishing room, one might very well keep the cost of each operation separate for purposes of comparison. Unless this is done, a man may know that the cost of finishing in his shop is too high, but he cannot know wherein the excessive cost lies.

If all the items of expense are grouped together, and the varnish is applied with a brush, and the rubbing done by hand, there is sure to be a considerable difference between the cost of finishing in that shop and a shop where varnish is applied with a spray, and rubbing is done with a rubbing machine. Where the work is all done by hand, the cost of material may be slightly less than in factories where machines are used but the cost of labor will be very much greater. If the total cost of finishing is too high one must know just where the cause of the excessive cost lies, in order to intelligently plan for a reduction.

Let us consider the various items of cost in the order in which I have named them. Cost of material includes everything used in the finishing process, including such items as rags, cotton waste, sea grass or whatever is used for cleaning off filler; also all brushes, dusters, pickers, etc.; rubbing felt, rubbing oil, pumice, and rottenstone, as well as the larger items of stain, filler, surfacer, varnish, etc. In many shops some of the smaller items are charged to overhead, but I believe that where any item is used directly in connection with the production of an article it is more satisfactory to charge the cost, no matter how small, directly to the production of the article. It may not be necessary to know the exact quantity of rags used for cleaning filler off each batch of 1000 dressers, because keeping track of the rags might cost more than the rags themselves.

However, it would be well to make occasional tests to ascertain any variation in the quantity, and if it seems worth while, ascertain the cause.

Productive labor is that which enters solely and directly into the improvement of the article finished. Men who work at staining, filling, surfacing, sanding varnishing, rubbing, etc., are engaged in productive labor, except in such instances as hereinafter noted, when such labor is non-productive and should not be charged to production, and in some instances where it should not even be charged to the finishing department. As before stated, the cost of these different operations should be kept separate so that each item can be closely watched so that any fluctuation can be noted, and the cause ascertained and, if need be, remedied.

Non-productive labor is that which does not increase the value of the article on which it is applied. It includes such items as trucking, stock-keeping and stock-chasing. In the final analysis these items must be charged to overhead in the finishing room, but they should be kept separate since any one of them is apt to be excessive without being readily detected, if all are grouped together.

Suppose the system of stock-keeping is right up to the minute and requires but little work; and suppose the finisher foreman is one of the progressive kind who keeps all his work well to the front, so that but little chasing after stock is necessary. These things will not preclude the possibility of a great deal of trucking being necessary and the cost being high. These three things, mentioned above, may be done by one or two or more men, according to the size of the shop. If all are grouped under one head, the cost in the aggregate may not seem excessive, but if they are separated the high cost of trucking would at once become apparent. Under such circumstances inquiry as to the excessive cost of trucking would be instituted at once, the cause ascertained and if possible a remedy applied.

Last, but by no means least, in the cost items enumerated, is that of repairs. A great deal of the repair work in the finishing department is the result of poor woodwork. It is a matter over which the finisher has no control. Cost of repairs of any kind should be kept separate from that of all other operations, and it should be charged to the department responsible for the defective work which necessitated the repairs.

In one factory the matter is worked out this way: If the workmanship in the finishing department is defective on any article so that it has to be done over again, or if an article is damaged while in that department so that it has to be repaired, a "repair-card" is attached to the article. This card bears the number of the department to which the repairs are to be charged, and each workman marks that number on his time card. If the repairs are necessitated through defective work by some other department, or if the finisher foreman contends that such is the case, while the foreman of the other department does not agree with him, a committee established for the purpose of deciding such matters is called in. Their decision is final, and the

Modern Finishing Requires Improved Methods

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eliminate all spray heads, pressure pump, piping and screens. Will keep lint, dirt and dust from finishing room. Are simple in construction and operation with low upkeep cost. Recirculate cleaned air from spray booth or buffing room.

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cost is charged to whatever department they hold to be responsible.

After several years' experience with cost accounting in the finishing departments of a number of factories, I am convinced that something similar to the above system is necessary, if it is to serve its purpose, and be fair to the finisher, and fair to the shop itself. I recall the case of one of the best foreman finishers I ever knew who lost his job because the cost of finishing as shown by the cost records was too high. The concern was making a line of plywood furniture. The veneering department did not understand its business. As a result the veneer checked badly on nearly all of the goods. When stock was dry and ready for the rubbing room the goods were found to be checked, and had to be recoated. In many cases the checks were not discovered until after considerable rubbing had been done. This extra work almost doubled the cost of finishing. It was not until the cost mounted higher under the new finisher, that the management could be persuaded to view matters in their true light.

Cost of finishing varies according to the size of the run of each kind of article. The cost per unit of a run of 200 articles will be less than that for a batch of 25 articles of the same kind. It frequently happens that when a new design is made the sales department is anxious to send out photographs and prices about the time the goods reach the finishing room. The finisher foreman is asked for an estimate of the cost of finishing, in order that the selling price may be based on cost of production. One such instance that is typical of many others may be related to illustrate the point.

A new bedroom suite was going through the factory, and one suite had been pushed ahead for the purpose of photographing. There were four new pieces—dresser, chifferobe, toilet table, and bed. The balance of the suite was to come out of standard stock. The foreman finisher was asked for an estimate on the cost of finishing these new pieces. He asked how many were in the batch, and was told 200 of each. He figured carefully; then gave the cost department an estimated cost. The photos were sent out, and they at once made a hit. Several orders came in before the first lot reached the finishing room. The finisher then received instructions to push 50 of the batch ahead of the others, and he did.

It happened at the time that the cost department was behind with its work. The estimate of cost having been used in fixing the selling price, the work of figuring the actual cost was not taken up until its turn came, which was some time after the goods had been completed. When the cost of the first 50 had been figured up, it proved to be considerably more than the foreman's estimate. However, on the larger lot, the cost was slightly less than 1 per cent under the estimate. The foreman had a fine time trying to explain the reason for this difference in cost. The management could not understand why there should be any difference, whether the number were 50 or 150. It does make a difference, because the smaller the batch, the more frequent are changes necessary. Changes take time in the finishing room as well as in the machine room.

It is seldom that anything is gained by splitting a batch of goods in the finishing department in order to rush a few pieces ahead. The remainder are delayed and the result is a loss of time and a corresponding increase in cost of production. It is true that splitting a batch of goods may enable one to fill some orders earlier, but it is also true that other orders are certain to be delayed by doing so. The others may be equally urgent and just as profitable. In any event, except in the case of piecework, it costs more to put goods through in small lots than it does in larger quantities. Even with piecework the finisher works under a handicap; he no more than gets into the swing of things, when he has to change.

Cost accounting in the finishing department, to be worthwhile, must show not only the total cost of finishing, but also the cause of any variation in the cost. It must be a true analysis of costs.

"Plastic Wood" For Restoring or Repairing Carvings, Moldings, and Other Ornamentation in Finished Woodwork.

A new manufactured product called "Necol Plastic Wood," is a material of the consistency of thick paste or moist dough, and used in its plastic condition will adhere firmly to any clean, dry surface of wood, metal or other material, on to which it is pressed.

The following excerpts from the manufacturer's pamphlet are of interest:

"Necol Plastic Wood can be moulded by hand into any conceivable form, and sets hard on exposure to the air to a tough, solid, waterproof substance similar in nature to wood but without any grain. The dried plastic wood can be worked with the ordinary woodworking tool. It will take nails and screws without splitting and is entirely free from any tendency to warp, crack, blister, peel or crumble even when exposed to moderate heat. A slight amount of contraction takes place on drying, but the material adheres so firmly to its bases that it does not draw away from anything to which it is properly applied.

"When dry, it will take paint, varnish or French polish just like ordinary wood. Spirit stain applied to the soft plastic wood is more effective than if the material is allowed to harden before staining. Where it is required to match the shade of the surrounding wood by this method, it must be borne in mind that the plastic wood, so dyed, becomes lighter on drying.

"Plastic wood should be applied in layers of about ⅛-in., each layer being allowed to harden before the application of the succeeding layer. Drying should not be hastened by exposure to a fire or flame as the vapor given off during hardening is inflammable. Not being affected by changes of temperature or climate, it does not crack or peel away like putty or other filling materials.

"Owing to its rapid drying properties, the plastic wood must be kept in tightly closed tins and not exposed to the air more than is absolutely necessary."

The English manufacturer of this product is represented by Harrison White, Inc., 19 West 44th St., New York City.

Getting Satisfactory Results With Wood Fillers

A practical finisher outlines several common filler troubles and explains clearly what the causes are, and how to overcome the difficulties, so as to always get satisfactory results.

By C. M. Curtice

EVERY finisher of wood products has had more or less trouble with filler. Some finishers have been able to locate the cause, and stop the trouble; sometimes the trouble has disappeared before the cause could be discovered. Other finishers not quite so fortunate seem to have filler trouble always—or at least it pays them frequent visits. In this article I will endeavor to diagnose some of these troubles,

Rubbing off excess filler with sea moss.

and point out the causes in such a way that the beginner, as well as the old-timer, will be able to locate them and correct them with little or no difficulty.

One of the meanest things the finisher has to contend with in the filling room is a sticky, quick-setting filler. It is not only that such a filler is mean to work with but it is the cause of numerous other troubles, good work cannot be done with it. These quick-setting fillers are not by any means always quick-drying fillers. In fact, some of them dry very slowly, especially toward the end of the drying process. The appearance of the surface of the wood gives the impression that the filler is dry, but well into the pores the filler is not dry; consequently, the subsequent coats of finishing material do not dry as they ought, and soon shrink away and lose their lustre.

Another trouble with sticky filler is that it pulls out of the pores in the process of cleaning off. If filler is to do good work it must cut off freely and easily. I have heard it said that an easy-working filler will pull out of the pores, but a little careful thought will convince any one that the more difficult it is to remove the surplus filler, the more the filler in the pores must be disturbed. The hard rubbing necessary to remove such filler, together with its sticky condition, makes it easier for the filler to leave the pores than to remain in; like everything else, it follows the course of least resistance. For this reason a hard-working filler is a prolific source of pinholes.

I know there is a great diversity of opinion regarding the cause of pinholes, especially when these occur in veneered work. I

have heard it contended that pinholes in veneered work are caused by the glue which came through to the surface; that they were minute holes in the glue which the filler could not fill. A man who held that view once sent me some boards and challenged me to fill and finish them without pinholes. After I had finished them there was not a sign of a pinhole. It is a fact that glue coming through the pores, and filling the minute air cells of the fibers surrounding the pores, makes it more difficult for the filler to obtain a firm hold on the walls of the pores; this makes it more easy for the filler to pull out of the pores during the process of cleaning up; but it does not make it impossible to fill the pores so as to avoid pinholes.

The cause of pinholes in varnish can always be traced to open pores, and open pores are always the result of improper filling which, in turn, may be the result of either poor filler, a wrong method of applying it, or an incorrect way of cleaning off. As I said before, the filler that causes pinholes is usually the sticky, hard-working kind. The stickiness is caused by an excess of the binding oils. Hard-working fillers are not always sticky. They may work hard because they set too rapidly; and they set too rapidly because they contain an excess of driers.

A well-proportioned filler ought to dry flat in 15 minutes under normal atmospheric conditions, but it would flatten out much more quickly if in line with a current of air—which is something that should never be permitted. The flattening of filler is caused by the evaporation of the volatile oils (benzine or gasoline). The hardening and drying of filler is caused by the oxidation

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DRY-SYS Equipments CHICAGO

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THE secret of the lacquer finish that will stand up is primarily in the undercoats. "A good beginning makes for a good end."

DRY-SYS equipment has been on the market for over ten years. It has a range in temperature of from 200 to 500° F, and is successfully handling furniture, fixtures, etc., finished in varnish, lacquer, and enamel.

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11 South Desplaines Street

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of the binding oils (linseed oil and drier). The larger the proportion of binding oils the slower will be the evaporation of the volatile oils. While filler ought to flatten and be ready to clean off within 15 minutes after it is applied, it ought to remain soft enough to clean off easily for at least 1½-hours. When filler becomes too hard to work easily within that time it indicates an excess of drier.

Driers are liquids that have the power to rapidly absorb oxygen from the air. They do not evaporate, but harden by the process known as oxidation. Linseed oil absorbs oxygen, but it does so very slowly, and if left to itself it would require a long time to harden. To overcome this tardiness in drying, a quick-acting oxidizing agent is added to it; the proportion in which these are mixed, determines the speed of drying. From this it will be seen that when filler dries too quickly the remedy lies in changing the proportions of the binding oils—lessening the quick-drying oil and increasing the slow-drying one.

Right here seems to be the proper place to call attention to another important matter in connection with filler. To do its work right, filler must contain a proper proportion of pigment and binding oils. As I have already pointed out, an excess of binding oils makes the filler sticky; but an excess of pigment will make the filler work floury, because there is insufficient binder to hold the particles of pigment together.

When filler dries too quickly for practical purposes, necessitating a reduction in the proportion of the drying agent used, it is necessary to replace the drying agent with an equal amount of the slow-drying oil, in order to maintain the balance between binder and pigment; if this is not done there will not be sufficient binder to hold the particles of pigment firmly together, and the floury condition will result. If the proportion of the quick-drying agent is reduced by adding more oil to the filler, then there should be added more pigment in proportion to the amount of oil added, to maintain the proper balance, otherwise the filler will be sticky.

I have known finishers to complain because the filler did not always work the same. It would work all right on some work and work either floury or sticky on other work. The proportion of oil and binder required to produce best results depends on the condition of the wood on which it is used. The amount of oil in the filler, at the time it is applied to the wood, is not the amount that remains with the pigment after the filler is dry, because the wood has drawn some of it away from the pigment. Whether the filler will work just right, or whether it will work floury or sticky, depends to a considerable extent on the absorbing nature of the wood on which it is used.

Suppose we make a filler that works just right on walnut, which has not been previously stained. Suppose we try using the same filler on oak that has been stained with an oil stain. We will find it works sticky. Suppose we try using it on mahogany that has been stained and given a

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When filler dries too quickly for practical purposes, necessitating a reduction in the proportion of the drying agent used, it is necessary to replace the drying agent with an equal amount of the slow-drying oil, in order to maintain the balance between binder and pigment; if this is not done there will not be sufficient binder to hold the particles of pigment firmly together, and the floury condition will result. If the proportion of the quick-drying agent is reduced by adding more oil to the filler, then there should be added more pigment in proportion to the amount of oil added, to maintain the proper balance, otherwise the filler will be sticky.

I have known finishers to complain because the filler did not always work the same. It would work all right on some work and work either floury or sticky on other work. The proportion of oil and binder required to produce best results depends on the condition of the wood on which it is used. The amount of oil in the filler, at the time it is applied to the wood, is not the amount that remains with the pigment after the filler is dry, because the wood has drawn some of it away from the pigment. Whether the filler will work just right, or whether it will work floury or sticky, depends to a considerable extent on the absorbing nature of the wood on which it is used.

Suppose we make a filler that works just right on walnut, which has not been previously stained. Suppose we try using the same filler on oak that has been stained with an oil stain. We will find it works sticky. Suppose we try using it on mahogany that has been stained and given a

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Works—Newark, N. J.

wash-coat of shellac. We will find it works even more sticky than it did on the oak. But suppose we try using it on mahogany or birch stained with a water stain, but not given the wash-coat of shellac. We will find it works floury.

The reason for the difference is this: Taking walnut as the standard for the filler, the proportion of binder and pigment was correct for binding the pigment after the wood had absorbed what it could. But when applied to the oak and mahogany, the former had its fine pores sealed up with oil stain, while the latter had its pores sealed with shellac, hence there was no absorption of oil from the pigment. The latter, being left with more oil than was necessary, naturally worked sticky. In the case of the mahogany and birch, which had not been wash-coated with shellac, the water stain had opened the pores and made them unusually absorbent; they left the pigment deficient in binder, hence the reason for it working floury.

Many finishers use the same filler on all their work that requires a medium dark pore. When this practice is followed the proper way to do is to make a filler to suit one of the woods, and then have that as standard. A good plan is to make a filler suitable for the least absorbent wood; when using this on the more absorbent woods, add sufficient binder to meet their requirements. This can be done by keeping on hand a mixture of linseed oil and drier in the correct proportions, and adding a little to the filler as occasion requires.

To get the pores of wood filled, so that there will be no danger of pinholes, the filler must be well brushed into them while it is in the liquid state. Some people talk about rubbing the filler into the pores when cleaning up, but my experience is that the less filler is rubbed after it has once set, the better. If well worked into the pores with the brush during the application there will be no need for rubbing it in, and little danger of rubbing it out.

Red Oxide of Lead for Metal.

For many years we have been using asphaltum varnish as a preservative for metals exposed to the weather, and we know of nothing better provided a good grade is used. But there are times when a color other than black is desired, and we are at a loss to know what will give permanency with the right color. Steam pipes inside the factory are frequently wanted in a different color than black. The problem has been solved by an European scientist, who says that red oxide of lead mixed with raw linseed oil to make a paint, will take the place of asphaltum varnish for the first coat. If it is desired to have a color other than red, this may be coated over with a paint of the desired color.

Red oxide of lead is what is known in this country as red lead, which is used chiefly by plumbers and steam-fitters for making pipe joints water-tight. There are three oxides of lead—black, yellow and red. The red oxide, as formerly made, usually contained considerable yellow oxide; this made it unsuitable for painting for the reason that it dried too much like cement; however, it was ideal for use in pipe joints. Red lead can now be obtained almost entirely free from yellow oxide, and it can be worked into a good metal paint for both inside and outside work. Many automobile finishers use it

To Readers Of

INDUSTRIAL FINISHING

You have long been looking for an independent journal devoted exclusively to practical finishing and you have, no doubt, visualized the kind of articles you would like to see printed and illustrated in such a journal. Perhaps you have felt prompted at times to write up some of your own experience, or to ask some questions about problems that come up in your work. Now is your opportunity. Here is a journal designed especially to meet your needs and to suit your convenience.

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FACTORY JERSEY CITY

as a first coater on metal bodies. A number of factories are using it on exposed steam pipes; it withstands considerable heat, and at the same time serves as a danger sign.

When mixed with pure raw linseed oil, pure red lead can be made into a paint that is slightly heavier than the ordinary white-lead paint. It flows out nicely and leaves no brush marks. The oxide should first be mixed into a smooth paste with a small quantity of oil, after which sufficient oil may be added to reduce it to a working consistency. In large factories, where a great deal of it is likely to be used, it would pay to buy a small grinder for making the paste perfectly smooth.—Chas. B. Wallace.

Finishing Fibre Car Bodies.

Many commercial cars or delivery automobiles are made with fibre bodies, and when these find their way into the custom paint shop to be refinished the painter is frequently at a loss as to the best way to remove the old finish; the fibre is too soft to permit scraping off the old paint and varnish. The best way to remove the old finish is to use a good paint or varnish remover, afterward washing thoroughly with a good grade of gasoline. Some paint removers contain considerable paraffin wax, and unless this paraffin is practically all removed from the surface it may interfere with the succeeding coats.

To neutralize any paraffin wax which may remain in the fibre after it has been thoroughly washed and all the gasoline has evaporated, a heavy coat of shellac should be applied. This will serve also to seal the pores of the surface and hold out succeeding coats. Never use a glue-size on any work that is to be exposed to the weather; it will ultimately cause the finish to peel off. Oil paint should not be used on bare fibre, because the oil penetrates so deeply that it cannot dry out readily.

On new work the pores may be sealed with a coat of good varnish. When this is dry, follow up with whatever material is to be used for building up the body of the finish. The same kind of materials may be used over the shellac on old work. Usually the first coat is one of equal parts white lead and "rough-stuff", followed by two or more coats of "rough-stuff" according to the quality of finish desired. Rub down with pumice and water, then apply a coat of flat color and follow with the color varnish coats. For an extra fine finish the varnish coats are rubbed down, and a coat of finishing varnish is applied. In any event the color varnish coats should be followed by a coat of finishing varnish to protect them from the weather; otherwise they will become spotted by the rain. —Cyril B. Hemming.

Many experienced finishers declare that the best pumice to use, for either coarse or fine rubbing, is pure Italian pumice imported as rock and ground in this country.

New Portable Spray Outfits

To meet the demands of the smaller concerns that do painting and finishing of various kinds, the U. S. Air Compressor Co., 5304 Harvard Ave., Cleveland, Ohio, announce four new models in portable paint and finish-spraying outfits, in addition to their large heavy-duty water-cooled equipment. These models are furnished in ¼, ½, ¾ and 1½-h. p. sizes. The outfits come complete with motor, air compressor, air drum, a spray gun and hose, all mounted on a low truck.

Developing Trained Finishers

Chief foreman finisher of large furniture manufacturing corporation stresses the importance of training workmen for the finishing department, and discusses the peculiar qualifications required of a successful instructor

By Cliff Stanton

IN every finishing department where men are hired there is a certain amount of training required. This training must be given by some one in the department and it is safe to assume that it will be given by one of the three following men: A—The foreman himself; B—An old employee; or C—An instructor.

There are many views regarding which method is best, and it is not the purpose here to discuss the merits of either "A" or "B". What I do want to point out is that if there is an instructor who can take any new man who enters the department and start him on his new job with dispatch and without friction, the chances are that the new man will begin to feel at home at once. He will be introduced to his new associates and he will find in his instructor a friend on whom he can call for information relative to his work, or the company, or any other problem which perplexes him.

Here let me call attention to some of the characteristics that a good finishing instructor must have. In a later article I will discuss ways and means of dividing the trade into teaching jobs, and outline the best methods of instructing new men on these jobs.

In listing these qualifications it must be borne in mind that we are thinking about a man who is going to do the training in a finishing department in co-operation with the foreman. In this case the foreman simply delegates the training responsibility to a man who is specializing on the trade of teaching finishing, for in reality it is as distinct a trade as is finishing.

In general the finisher who is to become an instructor should:

First—Have a good general education—above the average for his department if possible. This means the ability to read and express himself intelligently in writing.

Second—Be a thorough master of the trade which he expects to teach. He should be the best all-round man in his department, and be able to hold down any job in that department. He should be able to command the respect of every man in the shop through his superior ability and knowledge.

Third—Have mastered the technical side of his trade. It is not enough that he knows the "how" of his trade; he must know the "why" as well.

Fourth—Be of mature age but should not have reached the age where he is set in his ways. The successful instructor is the one who is continually growing in knowledge and ability through reading and application. As a rule he should be between 25 and 45 years of age.

Fifth—Have a personality that

Certainly, one has no conception of the vast number of products of wood and metal construction on which finishing coats are applied until investigating thoroughly. With some idea of the magnitude of the field to be covered, we were, nevertheless, surprised to learn of the diversified list of products manufactured as specified on the questionnaire reply postals.

Following, we attempt to list the numerous products in condensed form:

Automobiles
Agricultural Implements
Aeroplanes
Auto Radiators
Bank Fixtures
Bedroom Furniture
Bodies
Boats
Breakfast Room Furniture
Billiard Tables
Bookcases
Bicycles
Bed Springs
Bronze Ornaments
Barber Chairs
Cedar Chests
Clocks
Cabinets
Chairs
Clothes Dryers
Coasters
Caskets
Church Furniture
Costumers
Canoes
Cradles
Carpet Sweepers
Dining Room Furniture
Davenport Tables
Doors
Desks
Electric Fixtures
Furniture
Fireproof Doors
Filing Cabinets
Frames
Folding Tables
Fire Apparatus
Forgings
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Gocarts
Game Boards
Hardwood Products
House Trim
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Interior Finish
Incubators
Juvenile Furniture
Kitchen Cabinets
Kitchen Tables
Kitchen Stools
Lamps
Library Tables
Lodge Furniture
Lawn Mowers
Living Room Furniture
Lockers
Launches
Lighting Fixtures
Locomotives
Millwork
Metal Doors
Metal Caskets
Medicine Cabinets
Musical Instruments
Mantels
Metal Furniture
Metal Ornaments
Metal Screens
Metal Windows
Novelties
Office Fixtures
Organs
Ornaments
Pianos
Pipe Organs
Piano Benches
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Pulleys
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Wagons
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Yachts

Bear this in mind: Manufacturers of above products have requested that INDUSTRIAL FINISHING be sent to their foremen finishers, superintendents, purchasing agents and in many cases, direct to themselves. What it means to advertisers as affording a splendid avenue of approach to prospective customers is readily apparent.

ONE PAPER TO REACH ALL INDUSTRIAL CONCERNS MANUFACTURING WOODEN AND METAL PRODUCTS ON WHICH FINISHING COATS ARE APPLIED.

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KEN-NITE is used exclusively by practically every automobile company that has cars finished in Duco or Lacquer.

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will enable him to associate with men and win their confidence. This requires tact and an abundance of good common sense.

Sixth—Be trained for his "new" trade. To be a real trade instructor he must be able to impart his trade knowledge to the learners who come to him for instruction.

Seventh—Be a man. Knowledge and ability count for little if character is lacking. It has been commonly assumed that if a man could do a good job himself he could successfully teach a learner how to do it. This is not always true, however, for many men who can do a first-class job themselves cannot teach anybody else. It has been found that there are few "natural born teachers", but it has also been proved that the average good mechanic can acquire the ability to teach his trade if he is given the proper training.

One of the hardest jobs the all-round finisher has to do in learning to teach his trade is to change his way of thinking. For years his main thought has been to get out "production". He is now confronted with "instruction" which is an entirely different job. When he first starts to instruct he will be still thinking in terms of production. Mainly his difficulties are:

First—An inability to analyze his trade, or in other words, he cannot list out all the things that the learner must be taught if he is to learn the whole trade.

Second—He is unable to find out in a very short time just what the learner already knows about the job. He is liable to accept the learner's word for it, rather than put him through a rapid test to discover his abilities and short-comings.

Third—He is also unable to separate into its natural divisions a certain job, which he wants to teach, fitting it in its natural divisions and arranging these divisions so that he can give the least important thing first, and then add on to the learner's knowledge bit by bit until the whole job is taught.

Fourth—He is liable to get the learner confused because he is unable to express himself clearly. Clear expression comes from complete knowledge with the ability to analyze.

Fifth—He is rarely able to realize that telling or showing is not teaching, because they do not require any mental reaction on the part of the learner.

These are simply a few of the difficulties which the regular-line finisher will find himself up against, but the realization of this fact should not discourage him. These difficulties have been overcome by many finishers who have developed into most efficient instructors. How they did it will be shown in articles to follow.

Quality in finishing materials will always be one of the foremost thoughts in the minds of finish users, because so much depends upon the attractiveness and durability of the finish to the ultimate consumer.

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Question Department

These questions are submitted for reader's comments, suggestions and answers which will be printed in our next number. Your generous co-operation will make this department a valuable and interesting feature of every issue.

Finishing Wooden Lamps and Candlesticks.

We are manufacturers of wooden lamps and candlesticks and are interested in new methods of finishing these rapidly and economically.—P. R. W. N. M. Co.

Explain Action of Oil Stains on Different Woods.

I would like to see a practical and authentic explanation of the action of oil stains on different woods, and I feel sure that a great many furniture manufacturers are interested in the same thing.—G. E. M.

Will Shellac Serve as Undercoat for Green Enamel?

In your November issue we note on page 53 a small item as follows:

"To prevent woods from 'eating-up' or absorbing so much varnish, or under-coat paint for enamels, it is customary to apply one and sometimes two thin coats of shellac. One coat is usually sufficient excepting in cases where the wood is very porous or very oily."

This is of interest to us as we have a problem that we would appreciate further information as to proper finishing procedure, and would like to have you advise us the best course to follow.

The job that we have reference to consists of kiln dried maple slats that are used on chairs. These slats are about 3 inches wide, 16 inches long and ⅞ inch thick. They are to have one under-coating of shellac and one coating of green enamel. We propose to dip them in shellac, and then dip them in the green enamel. The object of wanting to use shellac is to save time in the drying.

Please advise whether shellac as an under-coating in a case of this nature will bring satisfactory results, and whether it might be colored green for the work.—G. E. & B., Inc.

What Kind of Container Is Best for Shellac?

We happen to notice one reference in the November number regarding the storage of orange shellac. We would like to learn about the experience of others in handling both white and orange shellac as far as the types of containers go. We have used tin-lined and also wood-lined containers for very high grades of shellac with quite a bit of success, and we believe it would be mutually advantageous for us to have a comparison of experiences on the subject.—M. R. B.

Extra effort expended in the preparation of the surface, by sanding and polishing, produces a better finish with less effort and with greater economy, than trying to hide defects with extra coats of varnish.

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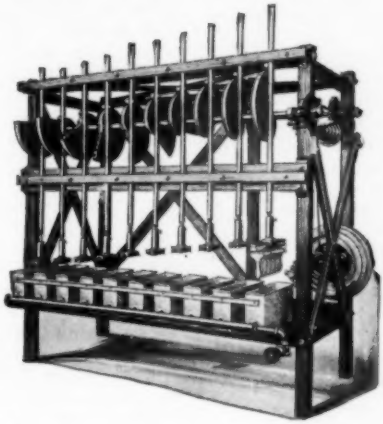

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Apply Shellac Only in a Dry Atmosphere.

In damp weather there is danger of the moisture in the atmosphere getting into shellac because shellac is dissolved in alcohol, and alcohol is a great absorbent of water. Hence the finisher must be very careful in wet or even moderately damp weather when applying shellac. This is especially true as regards finishing mahogany and walnut; there is danger of the finish turning a greenish cast. When you notice anything wrong with the appearance of the finish, as you proceed, stop at once. White shellac will turn pale, while orange shellac will turn green. Better quit until you are sure of a dry air in the shop. Provide heat, and close the windows against outer dampness. The heavier the shellac the greater the danger from moisture. It will show mostly at the edges and laps.—Paoli.

Finishing Hardwood Floors.

The finishing of a hardwood floor is done on the simple principle that the fewer coats of material the better the wear. A porous wood like oak requires paste filler. Liquid filler is sometimes used, but seldom if ever by a workman who understands his business. The finish may be either in wax, shellac, or copal varnish, a special grade being made for the purpose. Sometimes the floor gets two coats of thin shellac and that is its finish. It surely is.

Some finishers prefer to give two coats of floor varnish on top of the shellac coats. Many, on the other hand, will choose wax as the finish. It is, after all, just as the architect or owner may elect. The wax may be applied over the filler, or over a thin coat of shellac. Beeswax itself is too soft, therefore commercial floor waxes contain some hardening agent, some harder sort of wax, carnauba usually being chosen. Turpentine is the medium in which it is dissolved and this, by assisting the drying through evaporation, also hardens it thereby, at least to some extent. Two-thirds melted wax to one-third turpentine gives a good floor wax.—Oldtimer.

Lining the Spray Booth.

There is an old saying that what is worth doing, is worth doing well. Here is a picture of a well-lined spray booth. Every spray booth ought to be lined with paper to catch the particles of material that escape past the object being coated. When the paper becomes thickly coated it can be removed, and new paper put up. This way the booth is always fairly clean.

Good strong paper, especially made for lining booths, can be obtained for this purpose. It pays to use a good paper—a kind that is not easily torn. It takes time to line the walls with paper, and time is more valuable than even the best paper; if the paper becomes ragged and torn, it has to be replaced before its time.

Old sandpaper, from the sander drums, is a splendid thing with which to cover the floor and revolving table within the booth. This paper is strong, and will stand more wear than will any other available paper.

The man who keeps his spray booth neat and clean is the man who does better work. The condition of the spray booth is an indication of the kind of man be-

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hind the gun, and the kind of work he is capable of doing.

In the old days of the varnish brush and pot, one could tell the kind of work a man was doing by the condition of his tools. If his brush and pot were heavily coated with varnish, where they ought to be clean, we knew him

Interior of spray booth lined with paper which catches wasted finish.

to be a sloppy workman; we did not need to look over his work to know that there would be plenty of dirt and sagging. Can a neat and clean job of varnishing come out of a dirty and untidy spray booth? Yes, but it is not likely.

If the spray booth is made of wood, it is an easy matter to line it with paper; but if it is metal, the proposition is different. Then it becomes necessary to build a light wood frame inside the booth so as to have something on which to tack the paper. The frame need not be heavy—just sufficiently so to hold itself and the paper in place.—W. D. Boles.

Preparation of Wood Surface for Finish.

If one expects to obtain a high-quality finish on wood in the easiest way, either in natural finish or in enamel, it is well to remember that a great deal depends upon the condition of the surface that is to receive the coatings. While it may seem like putting in a great deal of labor and time on a job, to do any hand smoothing on the surface, I believe that this really effects a saving of time and labor in the end, and a better finish is the result. In these days of machine sanding and machine scraping we almost forget about smoothing by hand, using scrapers and sand blocks. We just say that the surface has been sanded, and then we start the finishing with staining, filling, etc.

When the surface has been sanded only by machine you will find, if you examine it closely, that there are small scratches or else a sort of pulp on the surface. In the case of open-grained woods, a certain portion of the sanding dust is packed into the pores. This will hardly be removed by dusting, but it will be picked out of the pores later during the finishing process and spread over the surface, especially if the work is finished by hand.

It has been my experience that a careful scraping with a sharp scraper, and a good rubbing with real fine sandpaper, will lessen the number of surfacing coats required. This will result in saving of time and a better looking and more durable finish, especially in the genuine walnut and mahogany, where the least number of coats of finish possible to produce a finish makes the wood stand out better than when a lot of material is piled on.—R. E. Morrison.

Finishers should be not only careful and skillful workmen, but artists as well, because it is up to them to give the final touch that lends color, beauty and durability to all finished articles.

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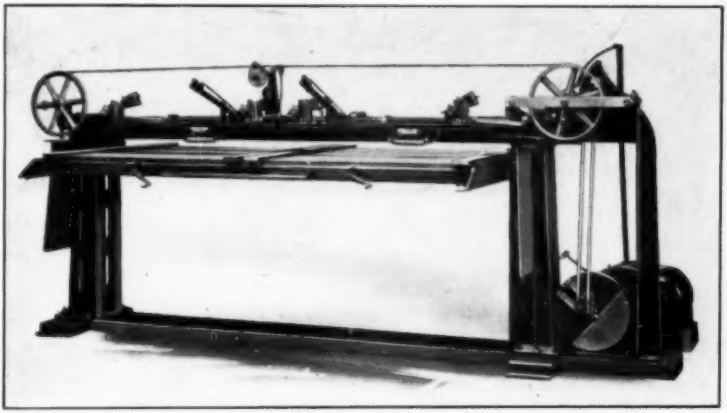

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